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REVIEW OF FAUNISTICAL DATA ON ODONATA IN BOSNIA & HERZEGOVINA

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Abstract

This paper deals with faunistical data and taxonomic notes on Odonata in Bosnia and Herzegovina. A database containing all available published, previously unpublished, and new data was made in order to create a review of the current knowledge of the country's Odonata fauna and point out the priorities in future investigations. 57 Odonata species are listed as resident species in Bosnia and Herzegovina. Of that number, exact data on the occurrence of 6 species (*Lestes parvidens*, *L. macrostigma*, *Erythromma viridulum*, *Aeshna grandis*, *Lindenia tetraphylla* and *Somatochlora flavomaculata*) are presented and discussed here for the first time.

KEY WORDS: Odonata, Bosnia, Herzegovina, Balkans

Introduction

Bosnia and Herzegovina is situated in the western part of the Balkan Peninsula. Roughly, the country can be divided into northern (Bosnia) and southern (Herzegovina) parts. Most of the country is occupied by the massif of the Dinaric Alps. The northern border of the country is constituted by the Sava River. However, in the northernmost part of the country, along the flow of the Sava River, part of the Pannonian basin is situated on the 'opposite' side of the bordering river. The strip between the Dinaric Alps and Pannonia is called peri-Pannonian Bosnia characterized by hills, valleys and rivers with flows oriented towards the north (fhe flow of the Sava River) (MARKOVIĆ, 1980). Bosnia and Herzegovina is almost landlocked, with access to the Adriatic Sea along only a very short shoreline in the vicinity of the town of Neum. Nevertheless, along the valley of the

Neretva River that empties into the Adriatic Sea in Croatian territory (not very far from the point where the river crosses the border between these two countries) Herzegovina experiences intensive influence of the Mediterranean. Similar influence penetrates into the territory of the country along the flow of the Trebišnjica River in the SE. Such variety of geographical features induced a considerable variety of climate and habitat types.

Dragonfly fauna of Bosnia and Herzegovina is insufficiently known. The first data on Odonata from Bosnia were presented by PETROVIĆ *et al*. (1891) as a report on an excursion of teachers and pupils of a secondary school. Among others, prominent Serbian naturalists like Petar PAVLOVIĆ and Živojin JURIŠIĆ were part of this team that collected naturalistic material in eastern Bosnia in the summer of 1890. Surprisingly, the most frequent excursions to Bosnia and Herzegovina resulting in the publication of data on Odonata fauna of the country took place at the end of the 19th century: PUSCHING (1896) published a little data based on material collected in Bosnia; Malcolm BURR visited 'Eastern Europe' (Bosnia, Herzegovina and Hugary and Wallachia) in the summer of 1898 and collected entomological material that was identified and published by MCLACHLAN (1898). That same summer, another excursion undertaken by Czech naturalists brought to the public additional data on Odonata of Bosnia and Herzegovina (KLAPALEK, 1898).

MORTON (1908) published data on material collected by Miss FOUNTAINE during a similar excursion to Bosnia and Herzegovina during the summer of 1907. RIS (1909, 1911) made a catalogue of the Libellulidae collection by Baron DE SELYS LONGHAMPS, including a review of contemporary literature data on species contained in the named collection. That review included data on Libellulidae from Bosnia and Herzegovina previously presented by MCLACHLAN (1898). Twenty years later, according to material from Trebinje and Mostar in Herzegovina FUDAKOWSKI (1930) described a new form of *Calopteryx splendens*, *C. s. balcanica* Fudakowski, 1930. The first paper that included a greater amount of data on dragonflies of Bosnia and Herzegovina was published by Živko ADAMOVIĆ (1948). The result of an inspection of the collection of the Biological Institute in Sarajevo (now held in the National Museum of Bosnia and Herzegovina in Sarajevo), it included some exceptionally important data for the generations of odonatologists that followed. The collection was created over a long period of time by a few collectors, perhaps the most important of whom was Viktor APFELBECK, a famous entomologist who was the first to notice that some *Calopteryx splendens* specimens from the western Balkans differ somewhat from the Central European specimens of this species. ADAMOVIĆ (1949) published another important paper on Odonata from Yugoslavia, based on the collection of the Natural History Museum in Belgrade. A few records from this paper were based on material collected in Bosnia and Herzegovina.

It was almost thirty years before the next paper that included data on Odonata of Bosnia and Herzegovina. DUMONT (1977) published Odonata records from Yugoslavia and adjacent regions of Romania and Bulgaria with important remarks on morphology, ethology and habitats of some Mediterranean species and subspecies. At the end of the 20th century and in the early 21st there were a few short papers, including some student papers, that gave additional insight into the regional fauna (DELIRY & LOOSE, 1987; FRANKOVIĆ, 1991; VUKIĆ, 1992; KIAUTA & KOTARAC, 1995; BUKVIĆ, 1998; RADEVIĆ *et al*., 2002). It is important to emphasize an important taxonomical paper partly based on material from Bosnia and Herzegovina from this period. ADAMOVIĆ & VIJATOV (1996) analysed morphometric differences between *Calopteryx splendens balcanica* and *C. s. ancilla.*

Material and Methods

A database containing all available published as well as previously unpublished and new data on Odonata in Bosnia and Herzegovina was made, analyzed and used for the production of a map of the distribution of Odonata records (Fig. 1).

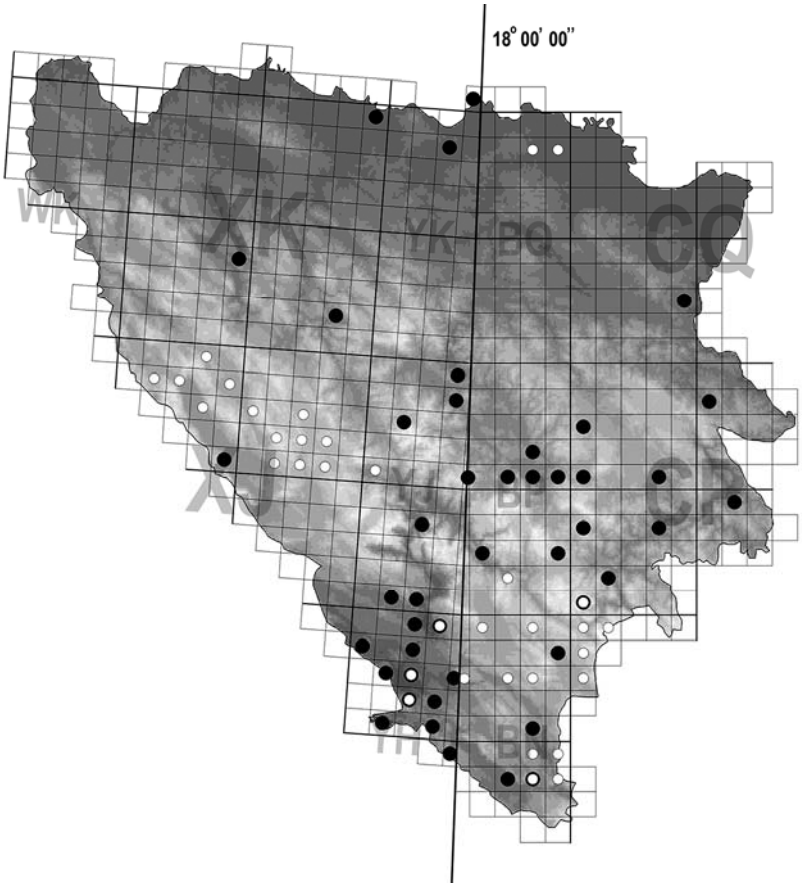

Figure 1. UTM map of Bosnia and Herzegovina showing distribution of Odonata records. Black dots designate UTM squares (10 x 10 km^2) with published records (literature data), white dots designate squares with new and previously unpublished records.

Most of the entomological material that was used for obtaining new data is stored in the collection of the Natural History Museum in Belgrade, while some specimens are kept in the private collection of the second author of this paper. The complete list of the locations from which originated previously unpublished and new data is given in Appendix 1.

Data referred to BOUDOT *et al*. (2009) were kindly provided by Elena DYATLOVA and Vincent KALKMAN.

Nomenclature used here corresponds with that given by DIJKSTRA & LEWINGTON (2006).

Results and Discussion

The following list contains all available faunistical data on Odonata in Bosnia and Herzegovina. Species recorded for the first time in the territory of Bosnia and Herzegovina (*Lestes parvidens*, *L. macrostigma*, *Erythromma viridulum*, *Aeshna grandis*, *Lindenia tetraphylla* and *Somatochlora flavomaculata*) are marked with an asterisk (*).

Family Calopterygidae

Calopteryx virgo (Linnaeus, 1758)

Published data:
KLAPALEK (1898), MORTON (1908), ADAMOVIĆ (1948), VUKIĆ (1992), BUKVIĆ (1998), BOUDOT *et al*. (2009), JOVIĆ & MIHAJLOVA (2009)

New data:
Bregava: Do, 2006-07-02, 3♂, 5♀, leg. et det. M. Jović, 3♂, 1♀, leg. G. Kulidžan, det. M. Jović, 2009-08-07, 5♂, 1♀, leg. et det. M. Jović (wing tips are paler than the rest of wings in male specimens); Fatničko polje: Vrijeka: Izvor, 2006-07-02, 1♂, 1♀, leg. et det. M. Jović, 1♂, leg. G. Kulidžan, det. M. Jović; Modriča: Mordički lug, 2006-08-06, 1♂, leg. et det. M. Jović, Stojićev potok, 2006-08-06, 1♂, 1♀, leg. et det. M. Jović; Trebišnjica: HPP Trebinje, 2008-07-11, 2♂, 1♀, leg. et det. B. Gligorović, Trebinje, 2008-07-11, 1♂, leg. et det. B. Gligorović; Zalomka: Fojnica, 2006-07-05, 1♂, 1♀, leg. et det. M. Jović, 2009-08-08, 2♂, leg. et det. M. Jović (wing tips are paler than the rest of wings).

Calopteryx splendens (Harris, 1780)

Published data:
PUSCHING (1896), MCLACHLAN (1898), ADAMOVIĆ (1948), VUKIĆ (1992), ADAMOVIĆ & VIJATOV (1996), BUKVIĆ (1998)

New data:
Bilećko jezero: Orah, 2006-07-04, 1♂, leg. et det. M. Jović; Gacko: Vrbica: Stari rudnik, 2009-08-10, 1♂, leg. et det. M. Jović; Modriča: Stojićev potok, 2006-08-06, 1♂, leg. et det. M. Jović.

Calopteryx splendens balcanica Fudakowski, 1930

Published data:
FUDAKOWSKI (1930), ADAMOVIĆ (1948), DUMONT (1977)

New data:
Bregava: Do, 2009-08-07, 1♂, leg. et det. M. Jović; Čapljina: Svitavsko jezero, 1973-07-15, 13♀, leg. et det. Ž. Adamović; Čapljina: Svitavsko jezero, 1973-07-15, 4♀, leg. et det. Ž. Adamović [wings are hyaline, marks on thorax resemble those of *C. balcanica* (ADAMOVIĆ & VIJATOV, 1996) - specimens are most probably young ones].

Family Lestidae

Lestes viridis (Vander Linden, 1825)

Published data:
ADAMOVIĆ (1948), BUKVIĆ (1998)

New data:
Gacko: Mušnica: Avtovac, 2009-08-10, 1♂, leg. et det. M. Jović (hybrid with *L. parvidens*?).

* *Lestes parvidens* Artobolevskii, 1929

New data:
Gacko: Mušnica: Avtovac, 2009-08-10, 1♀, leg. et det. M. Jović, Kupreško Polje: Rilić (vicinity), 2009-08-24, 1♂, leg. M. Stanković, det. M. Jović, Rumboci (vicinity), 2009-08-24, 1♀, leg. M. Stanković, det. M. Jović, Zlosela (vicinity), 2009-08-24, 1♀, leg. M. Stanković, det. M. Jović.

Note:
Presence of *L. parvidens* in Bosnia and Herzegovina was expected (OLIAS *et al*., 2007; JOVIĆ & MIHAJLOVA, 2009). It may be that some of the older records of *L. viridis* could be *L. parvidens* too.

Lestes barbarus (Fabricius, 1798)

Published data:
KLAPALEK (1898), ADAMOVIĆ (1948)

New data:
Bilećko jezero: Čepelica, 2008-07-11, 1♂, 2♀, leg. et det. B. Gligorović, Miruša, 2008-07-11, 2♂, leg. et det. B. Gligorović; Čapljina: Svitavsko jezero, 1973-07-15, 2♂, 1♀, leg. et det. Ž. Adamović; Modriča: Modričko polje, 2006-08-05, 2♂, 1♀, leg. et det. M. Jović, Stojićev potok, 2006-08-06, 1♀, leg. et det. M. Jović.

Lestes virens (Charpentier, 1825)

Published data:
ADAMOVIĆ (1948)

New data:
Modriča: Modričko polje, 2006-08-05, 4♂, 1♀, leg. et det. M. Jović.

* *Lestes macrostigma* (Eversmann, 1836)

New data:
Bilećko jezero: 2008-07-11, Seline, 2♂, 1♀, leg. et det. B. Gligorović.

Note:
This species is rare in the region and often connected with brackish waters (BOUDOT *et al*., 2009). In the adjacent parts of the neighbouring countries it was recorded in continental Croatia (BELANČIĆ *et al*., 2008), Adriatic Montenegro (ADAMOVIĆ, 1996) and an interesting locality in a mountainous area of Serbia near the border with Bosnia and Herzegovina (ANDJUS, 1992). Further investigations will likely show the presence of this species in more locations in Bosnia and Herzegovina.

Lestes sponsa (Hansemann, 1823)

Published data:
PETROVIĆ *et al*. (1891), ADAMOVIĆ (1948)

New data:
Bilećko jezero: Miruša, 2008-07-11, 1♂, leg. et det. B. Gligorović, Seline, 2008-07-11, 1♂, leg. et det. B. Gligorović; Kanjon Sutjeske, 2009-08-21, 1♀, leg. M. Stanković, det. M. Jović; Modriča: Modričko polje, 2006-08-05, 1♂, 1♀, leg. et det. M. Jović; Planina Zelengora: Donje Bare, 2009-08-14, 1♂, 1♀, leg. et det. M. Jović, Jugovo jezero, 2009-08-13, 2♂, leg. et det. M. Jović, Orlovačko jezero, 2009-08-13, 1♂, 2♀, leg. et det. M. Jović.

Lestes dryas Kirby, 1890

Published data:
ADAMOVIĆ (1948)

New data:
Planina Zelengora: Orlovačko jezero, 2009-08-13, 2♂, 1♀, leg. et det. M. Jović.

Sympecma fusca (Vander Linden, 1820)

Published data:
KLAPALEK (1898), ADAMOVIĆ (1948)

New data:
Bilećko jezero: Miruša, 2008-07-11, 1♂, leg. et det. B. Gligorović, Seline, 2008-07-11, 1♂, leg. et det. B. Gligorović; Planina Crvanj, 2009-08-22, 1♂, leg. M. Stanković, det. M. Jović.

Family Platycnemididae

Platycnemis pennipes pennipes (Pallas, 1771)

Published data:
PUSCHING (1896), KLAPALEK (1898), ADAMOVIĆ (1948), DUMONT (1977), JOVIĆ & MIHAJLOVA (2009)

New data:
Bilećko jezero: Miruša, 2008-07-11, 1♂, leg. et det. B. Gligorović, Muline, 2008-07-11, 2♂, leg. et det. B. Gligorović, Stanjevići, 2008-07-11, 1♂, 1♀, leg. et det. B. Gligorović; Bregava: Do, 2006-07-02, 4♂, 5♀, leg. et det. M. Jović; Čapljina, 1973-07-14, 1♂, leg. et det. Ž. Adamović; Gacko: Mušnica: Avtovac, 2009-08-10, 2♂, leg. et det. M. Jović, Vrbica: Stari rudnik, 2006-07-05, 1♂, 2009-08-10, 2♂, 1♀, leg. et det. M. Jović; Modriča: Mordički lug, 2006-08-06, 2♂, leg. et det. M. Jović, Reka Bosna, 2006-08-05, 3♂, 1♀, leg. et det. M. Jović; Trebišnjica: Trebinje, 2008-07-11, 2♂, 1♀, leg. et det. B. Gligorović; Zalomka: Fojnica, 2009-08-08, 2♂, leg. et det. M. Jović, Zalom, 2009-08-08, 1♂, leg. et det. M. Jović.

Family Coenagrionidae

Pyrrhosoma nymphula (Sulzer, 1776)

Published data:
ADAMOVIĆ (1948), VUKIĆ (1992)

New data:
Bilećko jezero: Seline, 2008-07-11, 1♂, leg. et det. B. Gligorović; Nevesinje: Logor, 2004-06-15, 1♂, 1♀, leg. et det. M. Jović, Nevesinjsko jezero, 2006-07-05, 1♂, leg. et det. M. Jović; Zalomka: Zalom, 2006-07-05, 1♂, leg. et det. M. Jović.

Erythromma najas (Hansemann, 1823)

Published data:
KLAPALEK (1898)

New data:
Bilećko jezero: Miruša, 2008-07-11, 2♂, 1♀, leg. et det. B. Gligorović, Seline, 2008-07-11, 2♂, 1♀, leg. et det. B. Gligorović, Stanjevići, 2008-07-11, 1♀, leg. et det. B. Gligorović.

* *Erythromma viridulum* (Charpentier, 1840)

New data:
Čapljina: Svitavsko jezero, 1973-07-15, 1♂, leg. et det. Ž. Adamović; Modriča: Mordički lug, 2006-08-06, 1♂, leg. et det. M. Jović; Planina Krug: Zagoričani (vicinity), 2009-08-25, 1♂, leg. M. Stanković, det. M. Jović; Planina Staretina: Halapić (vicinity), 2009-08-28, 1♀, leg. M. Stanković, det. M. Jović; Planina Zelengora: Perućica, 2009-08-19, 1♂, leg. M. Stanković, det. M. Jović.

Note:
Erythromma viridulum is a common species in Croatia and (at least) in the northern part of Serbia (see the map in BOUDOT *et al*., 2009). Records from Bosnia and Herzegovina were expected.

Erythromma lindenii (Selys, 1840)

Published data:
KLAPALEK (1898), ADAMOVIĆ (1949), DUMONT (1977)

New data:
Čapljina, 1973-07-14, 1♂, leg. et det. Ž. Adamović; Nevesinje: Nevesinjsko jezero, 2006-07-05, 5♂, 1♀, 2009-08-08, 4♂, leg. et det. M. Jović.

Coenagrion scitulum (Rambur, 1842)

Published data:
ADAMOVIĆ (1948)

Coenagrion ornatum (Selys, 1850)

Published data:
ADAMOVIĆ (1948)

Coenagrion puella (Linnaeus, 1758)

Published data:
MCLACHLAN (1898), MORTON (1908), ADAMOVIĆ (1948)

New data:
Bilećko jezero: Čepelica, 2008-07-11, 1♂, leg. et det. B. Gligorović, Seline, 2008-07-11, 2♂, 2♀, leg. et det. B. Gligorović, Stanjevići, 2008-07-11, 2♂, 1♀, leg. et det. B. Gligorović; Gacko: Vrbica: Stari rudnik, 2006-

07-05, 2♂, leg. et det. M. Jović; Nevesinje: Logor, 2004-06-15, 2♂, 1♀, leg. et det. M. Jović, Nevesinjsko jezero, 2004-06-15, 1♂, 1♀, leg. et det. M. Jović, 2006-07-05, 2♂, 1♀, leg. et det. M. Jović; Planina Zelengora: Donje bare, 2000-5-28, 1♀, leg. M. Stanković, det. M. Jović; Trebišnjica: Trebinje (road to Dubrovnik), 2006-07-06, 1♂, leg. et det. M. Jović; Zalomka: Fojnica, 2009-08-08, 1♂, leg. et det. M. Jović, Zalom, 2006-07-05, 4♂, 1♀, leg. et det. M. Jović.

Coenagrion pulchellum (Vander Linden, 1825)

Published data:
ADAMOVIĆ (1948)

New data:
Bilećko jezero: Čepelica, 2008-07-11, 1♂, leg. et det. B. Gligorović, Miruša, 2008-07-11, 2♂, 1♀, leg. et det. B. Gligorović, Seline, 2008-07-11, 1♂, leg. et det. B. Gligorović; Glamočko Polje: Glamoč: Zajaruga, 2009-08-26, 1♂, leg. M. Stanković, det. M. Jović; Planina Krug: Zagoričani (vicinity), 2009-08-25, 1♀, leg. M. Stanković, det. M. Jović.

Enallagma cyathigerum (Charpentier, 1840)

Published data:
ADAMOVIĆ (1948)

New data:
Gacko: Klinje jezero (upper lake), 2006-07-05, 2♂, leg. et det. M. Jović, Stari rudnik, 2006-07-05, 1♂, 2009-08-10, 3♂, 2♀, leg. et det. M. Jović; Kanjon Sutjeske, 2009-08-21, 1♂, leg. M. Stanković, det. M. Jović; Nevesinje: Nevesinjsko jezero, 2004-06-15, 1♂, leg. D. Todorović, det. M. Jović, 2004-06-15, 6♂, 1♀, 2009-08-08, 1♂, leg. et det. M. Jović; Planina Zelengora: Donje Bare, 2009-08-14, 2♂, leg. et det. M. Jović, Jugovo jezero, 2009-08-13, 2♂, 1♀, leg. et det. M. Jović, Orlovačko jezero, 2009-08-13, 2♂, 1♀, leg. et det. M. Jović.

Ischnura pumilio (Charpentier, 1825)

Published data:
KLAPALEK (1898), ADAMOVIĆ (1948)

New data:
Gacko: Mušnica: Avtovac, 2009-08-10, 1♀, leg. et det. M. Jović (orange specimen); Fatničko polje: Vrijeka: Izvor, 2006-07-02, 2♂, leg. et det. M. Jović; Modriča: Modričko polje, 2006-08-05, 2♂, 1♀, leg. et det. M. Jović.

Ischnura elegans (Vander Linden, 1820)

Published data:
ADAMOVIĆ (1948, 1949), DUMONT (1977)

New data:
Bilećko jezero: Miruša, 2008-07-11, 2♂, leg. et det. B. Gligorović; Čapljina: Svitavsko jezero, 1973-07-15, 10♂, 8♀, leg. et det. Ž. Adamović; Gacko: Vrbica: Stari rudnik, 2006-07-05, 1♂, 2009-08-10, 1♂, leg. et det. M. Jović; Glamočko Polje: Glamoč: Zajaruga, 2009-08-26, 2♂, leg. M. Stanković, det. M. Jović; Kupreško Polje: Gornje Ravno (vicinity), 2009-08-24, 3♂, 1♀, Zlosela (vicinity), 2009-08-24, 1♀, leg. M. Stanković, det. M. Jović; Modriča: Mordički lug, 2006-08-06, 1♂, Reka Bosna, 2006-08-05, 1♂, leg. et det. M. Jović; Nevesinje: Logor, 2004-06-15, 1♂, leg. D. Todorović, det. M. Jović, Nevesinjsko jezero, 2006-07-05, 1♀,

2009-08-08, 1♂, 2♀, leg. et det. M. Jović; Planina Cincar: Donji Malovan, 2009-08-24, 2♂, 2009-08-27, 1♂, 1♀, leg. M. Stanković, det. M. Jović; Planina Crvanj, 2009-08-21, 1♀ (well), 2009-08-22, 1♀ (meadow), leg. M. Stanković, det. M. Jović; Planina Šator: Gornje Peulje, 2009-08-26, 1♂, 1♀, leg. M. Stanković, det. M. Jović, Korita (vicinity), 2009-08-26, 1♂, leg. M. Stanković, det. M. Jović, Popovići (vicinity), 2009-08-26, 1♂, 2♀, leg. M. Stanković, det. M. Jović, Rore (vicinity), 2009-08-26, 2♂, leg. M. Stanković, det. M. Jović; Planina Zelengora: Perućica, 2009-08-19, 1♀, leg. M. Stanković, det. M. Jović; Trebišnjica: Trebinje (under small HPP), 2009-08-09, 1♂, 1♀, leg. et det. M. Jović.

Ceriagrion tenellum (De Villers, 1789)

Published data:
ADAMOVIĆ (1948)

New data:
Trebišnjica: Trebinje (under small HPP), 2009-08-09, 1♂, leg. et det. M. Jović.

Family Aeshnidae

Aeshna juncea (Linnaeus, 1758)

Published data:
ADAMOVIĆ (1948)

New data:
Planina Zelengora: Gornje Bare, 2009-08-20, 1♀, leg. M. Stanković, det. M. Jović, Donje Bare, 2009-08-14, 1♂, leg. et det. M. Jović, Jugovo jezero, 2009-08-13, 4♂, leg. et det. M. Jović, Orlovačko jezero, 2009-08-13, 2♂, 1♀, leg. et det. M. Jović.

Aeshna mixta Latreille, 1805

Published data:
PETROVIĆ *et al*. (1891), KLAPALEK (1898), ADAMOVIĆ (1948)

New data:
Bilećko jezero: Miruša, 2008-07-11, 2♂, 1♀, leg. et det. B. Gligorović.

Aeshna affinis Vander Linden, 1820

Published data:
MORTON (1908), ADAMOVIĆ (1948)

New data:
Fatničko polje: Vrijeka: Izvor, 2006-07-02, 1♂, leg. D. Todorović, det. M. Jović; Modriča: Mordički lug, 2006-08-06, 2♂, leg. et det. M. Jović; Planina Crvanj, 2009-08-21, 1♂, leg. M. Stanković, det. M. Jović; Čapljina: Svitavsko jezero, 1973-07-15, 1♂, leg. et det. Ž. Adamović.

Aeshna cyanea (Müller, 1764)

Published data:
PETROVIĆ *et al*. (1891), MORTON (1908), ADAMOVIĆ (1948)

New data:
Bilećko jezero: Muline, 2008-07-11, 1♂, leg. et det. B. Gligorović; Gatačko Polje: Gacka Reka, 2009-08-21, 1♂, leg. M. Stanković, det. M. Jović; Kupreško Polje: Rumboci (vicinity), 2009-08-23, 1♀, leg. M. Stanković, det. M. Jović, Šuica, 2009-08-25, 1♀, leg. M. Stanković, det. M. Jović; Planina Cincar: Donji Malovan, 2009-08-27, 1♂, leg. M. Stanković, det. M. Jović; Planina Šator: Gornje Peulje, 2009-08-26, 1♂, leg. M. Stanković, det. M. Jović; Planina Zelengora: Donje Bare, 2009-08-14, 1♂, 1♀ leg. et det. M. Jović, 2009-08-20, 1♂, leg. M. Stanković, det. M. Jović, Jugovo jezero, 2009-08-13, 1♂, leg. et det. M. Jović, Orlovačko jezero, 2009-08-13, 1♂, leg. et det. M. Jović.

* *Aeshna grandis* (Linnaeus, 1758)

New data:
Planina Staretina: Čatrnja (vicinity), 2009-08-28, 1♀, leg. M. Stanković, det. M. Jović; Planina Šator: Štekerovci (vicinity), 2009-08-26, 1♀, leg. M. Stanković, det. M. Jović; Planina Zelengora: Donje Bare, 2009-08-14, 1♂, 1♀, leg. et det. M. Jović, Orlovačko jezero, 2009-08-13, 1♂, 1♀, leg. et det. M. Jović.

Note:
Aeshna grandis was previously recorded from a few locations in the Dinaric Alps, in the territories of Croatia (BELANČIĆ *et al*., 2008) and Montenegro (ADAMOVIĆ *et al*., 1996). Newly recorded populations from Bosnia and Herzegovina fill the gap in the distribution pattern of this species along the mountain massif that covers much of the western part of the Balkan Peninsula. Populations from the lakes on Mt. Zelengora were abundant. Copulation and oviposition (mainly on *Carex* sp. plants) were observed.

Aeshna isoceles (Müller, 1767)

Published data:
ADAMOVIĆ (1948)

Anax imperator Leach, 1815

Published data:
MCLACHLAN (1898), ADAMOVIĆ (1948), DUMONT (1977), KIAUTA & KOTARAC (1995)

New data:
Bilećko jezero: Čepelica, 2008-07-11, 1♂, 1♀, leg. et det. B. Gligorović, Seline, 2008-07-11, 1♂, leg. et det. B. Gligorović, Stanjevići, 2008-07-11, 1♂, leg. et det. B. Gligorović; Nevesinje: Nevesinjsko jezero, 2006-07-05, 1♀, leg. et det. M. Jović.

Anax ephippiger (Burmeister, 1839)

Published data:
ADAMOVIĆ (1948)

Brachytron pratense (Müller, 1764)

Published data:
PETROVIĆ *et al*. (1891), ADAMOVIĆ (1948)

Caliaeschna microstigma (Schneider, 1845)

Published data:
ADAMOVIĆ (1948)

Family Gomphidae

Gomphus vugatissimus (Linnaeus, 1758)

Published data:
MORTON (1908), ADAMOVIĆ (1948)

New data:
Trebišnjica: HPP Trebinje, 2008-07-11, 1♂, 1♀, leg. et det. B. Gligorović, Trebinje, 2008-07-11, 2♂, leg. et det. B. Gligorović.

Onychogomphus forcipatus (Linnaeus, 1758)

Published data:
ADAMOVIĆ (1948), MORTON (1908), DUMONT (1977), BOUDOT *et al*. (2009)

New data:
Bregava: Do, 2006-07-02, 3♂, 2009-08-07, 1♂, leg. et det. M. Jović; Mostar: Buna, 1973-06-12, 6♂, leg. et det. Ž. Adamović; Trebišnjica: HPP Trebinje, 2008-07-11, 2♂, 1♀, leg. et det. B. Gligorović, Trebinje, 2008-07-11, 2♂, 1♀, leg. et det. B. Gligorović; Zalomka: Zalom, 2006-07-05, 1♂, 2009-08-08, 1♂, leg. et det. M. Jović.

* *Lindenia tetraphylla* (Vander Linden, 1825)

New data:
Trebišnjica: HPP Trebinje, 2008-07-11, 2♂, leg. et det. B. Gligorović.

Note:
The species was recorded from Mediterranean parts of Croatia (BELANČIĆ *et al*., 2008) including Neretva Delta (BUKVIĆ, 1998) and Montenegro (JOVIĆ, 2008; JOVIĆ *et al*., 2008). It is not known if the recorded population from Trebinje presents a temporary or permanent one. Further investigations are needed.

Family Cordulegastridae

Cordulegaster bidentata Selys, 1843

Published data:
KLAPALEK (1898), MORTON (1908), ADAMOVIĆ (1948)

Family Corduliidae

Cordulia aenea (Linnaeus, 1758)

Published data:
ADAMOVIĆ (1948)

New data:
Planina Zelengora: Jugovo jezero, 2009-08-13, 1♂, leg. et det. M. Jović.

Somatochlora metallica (Vander Linden, 1825)

Published data:
ADAMOVIĆ (1948)

Somatochlora meridionalis Nielsen, 1935

Published data:
DUMONT (1977)

New data:
Trebišnjica: Trebinje, 2008-07-11, 2♂, 1♀, leg. et det. B. Gligorović; Trebinje (road to Dubrovnik), 2006-07-06, 1♂, leg. et det. M. Jović.

* *Somatochlora flavomaculata* (Vander Linden, 1825)

New data:
Glamočko Polje: Medena Selišta, 2009-08-24, 1♂, leg. M. Stanković, det. M. Jović.

Note:
A comprehensive analysis of regional distribution of *S. flavomaculata* was done by BEDJANIČ *et al*. (2008). According to their conclusions habitat types preferred by this species in the region of SE Europe are a bit diverse (from lowland, more or less eutrophic standing waters, through karst rivers and lakes, coastal swamps and canals to lakes at higher altitudes). Common to all these habitat types would be rich vegetation. Still, regional records are rare. The same authors predicted an occurrence of *S. flavomaculata* in Bosnia and Herezegovina, in lower sections of Neretva. A recent record originates from one of the karst fields situated in the western part of the country. The local population could be (or used to be) connected with populations in continental Croatia (BELANČIĆ *et al*., 2008).

Epitheca bimaculata (Charpentier, 1825)

Published data:
ADAMOVIĆ (1948)

Family Libellulidae

Libellula quadrimaculata Linnaeus, 1758

Published data:
ADAMOVIĆ (1948)

New data:
Planina Zelengora: Donje Bare, 2009-08-14, 1♂, leg. et det. M. Jović, Jugovo jezero, 2009-08-13, 1♂, leg. et det. M. Jović.

Libellula fulva Müller, 1764

Published data:
ADAMOVIĆ (1948), BUKVIĆ (1998)

New data:
Čapljina, 1973-07-14, 8♀, leg. et det. Ž. Adamović, Svitavsko jezero, 1973-07-15, 1♂, 2♀, leg. et det. Ž. Adamović.

Libellula depressa Linnaeus, 1758

Published data:
KLAPALEK (1898), ADAMOVIĆ (1948), DUMONT (1977)

New data:
Gacko: Klinje jezero (upper lake), 2006-07-05, 1♂, leg. et det. M. Jović, Vrbica: Stari rudnik, 2009-08-10, 1♂, leg. et det. M. Jović; Bilećko jezero: Čepelica, 2008-07-11, 2♂, leg. et det. B. Gligorović, Bilećko jezero: Seline, 2008-07-11, 1♂, leg. et det. B. Gligorović, Stanjevići, 2008-07-11, 1♂, 1♀, leg. et det. B. Gligorović; Nevesinje: Logor, 2004-06-15, 1♂, leg. et det. M. Jović, Nevesinjsko jezero, 2006-07-05, 2♂, leg. et det. M. Jović; Planina Zelengora: Orlovačko jezero, 2009-08-13, 1♂, leg. et det. M. Jović; Zalomka: Zalom, 2006-07-05, 1♂, leg. et det. M. Jović.

Orthetrum cancellatum (Linnaeus, 1758)

Published data:
MCLACHLAN (1898), ADAMOVIĆ (1949), DUMONT (1977), BUKVIĆ (1998)

New data:
Bilećko jezero: Orah, 2006-07-04, 1♂, leg. et det. M. Jović; Čapljina: Svitavsko jezero, 1973-07-15, 1♂, leg. et det. Ž. Adamović; Nevesinje: Nevesinjsko jezero, 2004-06-15, 2♂, 2006-07-05, 1♂, 2009-08-08, 1♂, leg. et det. M. Jović; Planina Zelengora: Orlovačko jezero, 2009-08-13, 1♂, 1♀, leg. et det. M. Jović.

Orthetrum albistylum (Selys, 1848)

Published data:
ADAMOVIĆ (1948)

New data:
Modriča: Mordički lug, 2006-08-06, 3♂, leg. et det. M. Jović.

Orthetrum brunneum (Fonscolombe, 1837)

Published data:
KLAPALEK (1898), MCLACHLAN (1898), RIS (1909), ADAMOVIĆ (1948), DUMONT (1977), BOUDOT *et al*. (2009)

New data:
Bilećko jezero: Miruša, 2008-07-11, 1♂, 1♀, leg. et det. B. Gligorović, Muline, 2008-07-11, 2♂, 2♀, leg. et det. B. Gligorović, Stanjevići, 2008-07-11, 2♂, leg. et det. B. Gligorović; Čapljina, 1973-07-14, 1♀, leg. et det. Ž. Adamović; Trebišnjica: Trebinje (under small HPP), 2009-08-09, 1♂, leg. et det. M. Jović.

Orthetrum coerulescens (Fabricius, 1798)

Published data:
MCLACHLAN (1898), MORTON (1908), RIS (1909), ADAMOVIĆ (1948), VUKIĆ (1992)

New data:
Čapljina, 1973-07-14, 1♀, leg. et det. Ž. Adamović, Svitavsko jezero, 1973-07-15, 2♂, leg. et det. Ž. Adamović; Fatničko polje: Vrijeka: Izvor, 2009-08-07, 1♂, leg. et det. M. Jović; Nevesinje: Nevesinjsko

jezero, 2006-07-05, 1♂, 2009-08-08, 1♂, leg. et det. M. Jović; Planina Crvanj, 2009-08-22, 1♂, leg. M. Stanković, det. M. Jović; Trebišnjica: Trebinje (under small HPP), 2009-08-09, 7♂, 2♀, leg. et det. M. Jović.

Crocothemis erythraea (Brullé, 1832)

Published data:
ADAMOVIĆ (1948, 1949), DUMONT (1977)

New data:
Čapljina: Svitavsko jezero, 1973-07-15, 6♂, 3♀, leg. et det. Ž. Adamović; Bilećko jezero: Muline, 2008-07-11, 2♂, 1♀, leg. et det. B. Gligorović, Seline, 2008-07-11, 1♂, leg. et det. B. Gligorović; Planina Cincar: Draganjić, 2009-08-28, 1♀, leg. M. Stanković, det. M. Jović, Donji Malovan, 2009-08-24, 1♂, leg. M. Stanković, det. M. Jović; Planina Šator: Štekerovci (vicinity), 2009-08-26, 1♀, leg. M. Stanković, det. M. Jović.

Sympetrum striolatum (Charpentier, 1840)

Published data:
KLAPALEK (1898), MORTON (1908), ADAMOVIĆ (1948)

New data:
Bilećko jezero: Miruša, 2008-07-11, 1♂, leg. et det. B. Gligorović, Muline, 2008-07-11, 1♂, 1♀, leg. et det. B. Gligorović; Fatničko polje: Vrijeka: Izvor, 2009-08-07, 1♂, leg. et det. M. Jović; Nevesinje: Nevesinjsko jezero, 2006-07-05, 1♂, 1♀, leg. et det. M. Jović.

Sympetrum vulgatum (Linnaeus, 1758)

Published data:
RADEVIĆ *et al*. (2002)

Sympetrum meridionale (Selys, 1841)

Published data:
KLAPALEK (1898), MORTON (1908), DUMONT (1977)

New data:
Bilećko jezero: Čepelica, 2008-07-11, 1♂, 1♀, leg. et det. B. Gligorović, Miruša, 2008-07-11, 2♂, 1♀, leg. et det. B. Gligorović, Stanjevići, 2008-07-11, 1♂, leg. et det. B. Gligorović; Glamočko Polje: Glamoč: Zajaruga, 2009-08-26, 1♀, leg. M. Stanković, det. M. Jović; Planina Šator: Korita (vicinity), 2009-08-26, 1♂, leg. M. Stanković, det. M. Jović; Planina Zelengora: Perućica, 2009-08-19, 1♂, leg. M. Stanković, det. M. Jović.

Sympetrum fonscolombii (Selys, 1840)

Published data:
ADAMOVIĆ (1948, 1949), DUMONT (1977)

New data:
Gacko: Vrbica: Stari rudnik, 2009-08-10, 1♂, leg. et det. M. Jović; Planina Zelengora: Orlovačko jezero, 2009-08-13, 1♂, leg. et det. M. Jović; Trebišjica: Trebinje: Stari most, 2007-09-03, 2♀, leg. et det. M. Jović.

Sympetrum flaveolum (Linnaeus, 1758)

Published data:
KLAPALEK (1898), MCLACHLAN (1898), MORTON (1908), RIS (1911), ADAMOVIĆ (1948), VUKIĆ (1992)

New data:
Bilećko jezero: Seline, 2008-07-11, 2♂, leg. et det. B. Gligorović; Planina Zelengora: Jugovo jezero, 2009-08-13, 4♂, leg. et det. M. Jović, Orlovačko jezero, 2009-08-13, 3♂, 2♀, leg. et det. M. Jović.

Sympetrum sanguineum (Müller, 1764)

Published data:
PUSCHING (1896), MCLACHLAN (1898), RIS (1911), ADAMOVIĆ (1948, 1949), DUMONT (1977), DELIRY & LOOSE (1987)

New data:
Bregava: Do, 2009-08-07, 1♂, leg. et det. M. Jović, 2009-08-07, 1♀, leg. N. Kulidžan, det. M. Jović; Čapljina: Svitavsko jezero, 1973-07-15, 1♂, leg. et det. Ž. Adamović; Fatničko polje: Vrijeka: Izvor, 2006-07-02, 1♂, 2009-08-07, 2♀, leg. et det. M. Jović; Glamočko Polje: Medena Selišta, 2009-08-24, 1♀, leg. M. Stanković, det. M. Jović; Kupreško Polje: Rilić (vicinity), 2009-08-24, 1♂, leg. M. Stanković, det. M. Jović, Šuica, 2009-08-25, 1♂, 1♀, leg. M. Stanković, det. M. Jović; Modriča: Mordički lug, 2006-08-06, 3♂, 2♀, leg. et det. M. Jović, Modričko polje, 2006-08-05, 1♂, leg. et det. M. Jović; Nevesinje: Nevesinjsko jezero, 2009-08-08, 3♂, leg. et det. M. Jović; Planina Cincar: Draganjić, 2009-08-28, 1♀, leg. M. Stanković, det. M. Jović; Planina Staretina: Halapić (vicinity), 2009-08-28, 1♀, leg. M. Stanković, det. M. Jović; Planina Šator: Popovići (vicinity), 2009-08-26, 1♂, leg. M. Stanković, det. M. Jović, Rore (vicinity), 2009-08-26, 1♂, leg. M. Stanković, det. M. Jović; Planina Zelengora: Orlovačko jezero, 2009-08-13, 1♂, leg. et det. M. Jović; Trebišnjica: Trebinje (road to Dubrovnik), 2009-08-09, 1♀, leg. et det. M. Jović.

Leucorrhinia pectoralis (Charpentier, 1825)

Published data:
ADAMOVIĆ (1948), FRANKOVIĆ (1991)

Comparable to other countries of the Balkan Peninsula, Odonata fauna of Bosnia and Herzegovina is still insufficiently known and there is a great need for future comprehensive and systematic research. KLAPALEK (1898) wrote that in terms of knowledge of Neuroptera and Pseudoneuroptera, Bosnia and Herzegovina is *terra incognita*, even more so than some countries, remote for Europeans, such as Turkestan or the deserts of southern Africa. 112 years later, the situation remains the same. It is premature to make generalizations but there are some species likely to be recorded in Bosnia and Herzegovina:

1) *Coenagrion hastulatum* (Charpentier, 1825). This species is generally rare on the Balkan Peninsula. In neighboring countries it was found in Montenegro (ADAMOVIĆ *et al*., 1996; GLIGOROVIĆ *et al*., 2009) and Serbia (ADAMOVIĆ, 1990). This species is expected in the mountainous part of the country.

2) *Anax parthenope* Selys, 1839. Records of this species are expected both in Pannonian (peri-Pannonian) and Mediterranean parts of the country. In Croatia, *A. parthenope* was recorded in the region of Neretva Delta (DUMONT, 1977; BUKVIĆ, 1998) as well as in other parts of the country, generally in isolated populations (BELANČIĆ *et al*., 2008). In Serbia, the species is more often found in the Pannonian part than in the rest of the country (JOVIĆ *et al*., 2009). In Montenegro, *A. parthenope* was recorded by Matjaž BEDJANIČ on the firth

of the Bojana River into the Adriatic Sea (JOVIĆ *et al*., 2008) and observed in May 2007 in the village Dodoši, on the shore of Lake Skadar, in the Mediterranean part of the country (JOVIĆ, 2008).

3) *Gomphus flavipes* (Charpentier, 1825). The species is found along the flows of the Danube and Sava Rivers in Serbia and Croatia (see the map in BOUDOT *et al*., 2009). Keeping in mind that the Sava River is a natural border between Bosnia and Croatia there is reason to expect the presence of *G. flavipes* in northern, Pannonian and peri-Pannonian parts of Bosnia.

4) *Ophiogomphus cecilia* (Charpentier, 1840). Distribution of this species in neighbouring countries is mainly confined to lowland rivers of Pannonia (ADAMOVIĆ, 1948; BELANČIĆ *et al*., 2008). *O. cecilia* may be expected in the Pannonian part of Bosnia, as well.

5) *Cordulegaster heros* Theischinger, 1979. The species is recorded in all of the neighbouring countries (BOUDOT *et al*., 2009). Suitable habitats are positively present in hilly and mountainous parts of Bosnia & Herzegovina so it is expected that future investigations will show the presence of *C. heros* in the territory of this country.

6) *Leucorrhinia dubia* (Vander Linden, 1825). In southern Europe the species is confined to peat bogs and acid ponds and lakes at higher altitudes (BOUDOT *et al*., 2009). In the adjacent countries, *L. dubia* was found on mountains of Montenegro - Mt. Sinjajevina and Mt. Durmitor (ANDJUS & ADAMOVIĆ, 1985; ADAMOVIĆ *et al*., 1996;) and Serbia - Mt. Golija (ADAMOVIĆ, 1990). Much of the territory of Bosnia and Herzegovina is covered by the massif of the Dinaric Alps. Suitable habitats are certainly present so we expect that future investigations will discover the populations of *L. dubia* in Bosnia and Herzegovina.

7) *Sympetrum depressiusculum* (Selys, 1841). This species can be expected at least in the northern, Pannonian part of the country. In the adjacent countries, *S. depressiusculum* was recorded in Croatia (BELANČIĆ *et al*., 2008) and Serbia (SANTOVAC *et al*., 2005). Preferred habitats, such as fishponds and marshes, are present along the flow of the Sava River.

8) *Sympetrum pedemontanum* (Müller in Allioni, 1766). The species is rare in the region of central and western Balkans. There are only two locations with recorded populations in the adjacent countries - one in Croatia (BELANČIĆ *et al*., 2008) and one in Serbia (ADAMOVIĆ, 1949). The record from Serbia is from the region bordering Bosnia. It is possible that *S. pedemontanum* could be found in hilly and mountainous parts of Bosnia.

9) *Selysiothemis nigra* (Vander Linden, 1825). There are records of this species from Croatia (BELANČIĆ *et al*., 2008) and Montenegro (JOVIĆ, 2008). All the records are confined to the habitats near or on the Adriatic Coast. Some of these are from the Neretva Delta (BUKVIĆ, 1998). It is expected that *S. nigra* could penetrate deeper into the land of the Balkan Peninsula reaching the territory of Bosnia and Herzegovina. The most probable route would be the valley of the Neretva River.

10) *Pantala flavescens* (Fabricius, 1798). This migrant species was recently reported from Montenegro, from the town of Herceg-Novi near the border between Croatia and Bosnia and Herzegovina (OBER, 2008). Possible future migrations in the same direction allow us to expect records of *P. flavescens* from both Bosnia and Herzegovina and Croatia.

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ПРЕГЛЕД ЗНАЊА О ФАУНИ ODONATA БОСНЕ И ХЕРЦЕГОВИНЕ

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Извод

Тема овог рада су фаунистички подаци о Odonata у Босни и Херцеговини. Креирана је база података свих доступних објављених али и нових и претходно необјављених података. База је коришћена за потребе сагледавања тренутног знања о фауни вилинских коњица ове земље и препознавања и постављања приоритета у будућим истраживањима. Резултати досадашњих истраживања су показали да на територији БиХ живе представници 57 врста Odonata. У овом раду су први пут представљени и продискутовани конкретни подаци о присуству и распрострањењу 6 врста Odonata (*Lestes parvidens*, *L. macrostigma*, *Erythromma viridulum*, *Aeshna grandis*, *Lindenia tetraphylla* и *Somatochlora flavomaculata*) у БиХ.

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Appendix 1

List of visited localities (with habitat types, UTM MGRS 10x10 km^2 squares marks and altitudes):

Bilećko jezero: Čepelica (Lake, 34TBN84)
Bilećko jezero: Miruša (Lake, 34TBN94)
Bilećko jezero: Muline (Lake, 34TBN93)
Bilećko jezero: Orah (Lake, 34TBN84)
Bilećko jezero: Seline (Lake, 34TBN93)
Bilećko jezero: Stanjevići (Lake, 34TBN84)
Bregava: Do (River, 34TBN57, 110 m a.s.l.)
Čapljina (33TYH27)
Čapljina: Svitavsko jezero (Lake, 33TYH26)
Fatničko polje: Vrijeka: Izvor (River, 34TBN77, 480 m a.s.l.)
Gacko: Klinje jezero (upper lake) (Lake, 34TCN08)
Gacko: Mušnica: Avtovac (River, 34TCN07, 954 m a.s.l.)
Gacko: Vrbica: Stari rudnik (Pond, 34TCN07, 945 m a.s.l.)
Gatačko Polje: Gacka Reka (River, 34TCN08)
Glamočko Polje: Glamoč: Zajaruga (Meadow, 33TXJ57)
Glamočko Polje: Medena Selišta (Wet meadow, 33TXJ48)
Kanjon Sutjeske (Canyon of the river, 34TCN09)
Kupreško Polje: Gornje Ravno (vicinity) (Meadow, 33TXJ85)
Kupreško Polje: Rilić (vicinity) (Meadow, 33TXJ86)
Kupreško Polje: Rumboci (vicinity) (Meadow, 33TYJ05)
Kupreško Polje: Šuica (River, 33TXJ75)
Kupreško Polje: Zlosela (vicinity) (Cliffs, 33TXJ77)
Modriča: Modričko polje (Marsh, 34TBQ88, 100 m a.s.l.)
Modriča: Mordički lug (Pond, 34TBQ98, 95 m a.s.l.)
Modriča: Reka Bosna (River, 34TBQ88)
Modriča: Stojićev potok (Stream, 34TBQ77/88)
Mostar: Buna (River, 33TYH39)
Nevesinje: Logor (Stream, 34TBN69)
Nevesinje: Nevesinjsko jezero (Lake, 34TBN69, 840 m a.s.l.)
Planina Cincar: Donji Malovan (Meadow, 33TXJ76)
Planina Cincar: Draganjić (Pasture, 33TXJ66)
Planina Crvanj (Meadow, 34TBP71)
Planina Crvanj (Well, 34TBP71)
Planina Krug: Zagoričani (vicinity) (Meadow, 33TXJ65)
Planina Šator: Gornje Peulje (Well, 33TXJ28)
Planina Šator: Korita (vicinity) (Meadow, 33TXJ18)
Planina Šator: Popovići (vicinity) (Rocky meadow, 33TXJ39)
Planina Šator: Rore (vicinity) (Meadow, 33TXJ39)
Planina Šator: Štekerovci (vicinity) (Watering place, 33TXJ39)
Planina Staretina: Čatrnja (vicinity) (Well, 33TXJ37)
Planina Staretina: Halapić (vicinity) (Rocks, 33TXJ48)
Planina Zelengora: Donje Bare (Lake, 34TCN09, 1480 m a.s.l.)

Planina Zelengora: Gornje Bare (Lake, 34TCN09)
Planina Zelengora: Jugovo jezero (Lake, 34TCP00, 1540 m a.s.l.)
Planina Zelengora: Orlovačko jezero (Lake, 34TCP00, 1445 m a.s.l.)
Planina Zelengora: Perućica (Stream, 34TCN19)
Trebišnjica: HPP Trebinje (River, 34TBN93)
Trebišnjica: Trebinje (River, 34TBN93)
Trebišnjica: Trebinje (road to Dubrovnik) (River, 34TBN83, 274 m a.s.l.)
Trebišnjica: Trebinje (under small HPP) (Pond, 34TBN83, 280 m a.s.l.)
Trebišnjica: Trebinje: Stari most (River, 34TBN83)
Zalomka: Fojnica (River, 34TBN89, 950 m a.s.l.)
Zalomka: Zalom (River, 34TBN89, 930 m a.s.l.)